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China: Factors Behind the Surge in Heavy Industry

Summary

The sharp 9.9 percent jump last year in the value of heavy industry greatly overfulfilled the original target of 1 percent. This unplanned increase can be largely attributed to a resurgence of activity in the machine building sector. Machine building ended the year with an increase of almost 16 percent, about half of the overall jump in heavy industry. [redacted]

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The evidence available to us indicates that an unexpected increase in capital investment (up 21 percent) resulted in large new orders for producer goods such as machinery and equipment. The machine building industry was operating far below capacity because of economic readjustment and was easily able to sharply boost output to supply such priority sectors as transport, energy, and agriculture. Some of the increase in heavy industry also resulted from unanticipated growth in production of military hardware that was spurred by exports to the Middle East. [redacted]

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Early trends in 1983 indicate that Chinese officials are continuing to have difficulty controlling the rate of heavy industrial growth. Data for the first quarter show heavy industry up by almost 12 percent over the previous year, well above the 3 percent target for 1983. Excess capacity in machine building continues to give plant managers considerable opportunity to exceed state plans. We believe, however, that a 12-percent growth rate for the entire year cannot be sustained, although chances are good that final growth could end up in the 5 to 7 percent range. A growth rate at this level would not overburden China's heavy industrial sector, which is still suffering from the effects of readjustment policies, but could further strain energy supplies and retard growth in light

This memorandum was prepared by [redacted] the China Division of the Office of East Asian Analysis. Questions and comments are welcome and may be directed to the author [redacted]

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industry. Historically, however, Beijing has found it difficult--if not impossible--to strike a balance between heavy and light industry that satisfies both consumer needs and investment requirements. []

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The Six Components of Heavy Industry

Heavy industry in China includes forestry, building materials, metallurgy, energy, chemicals, and machine building. The largest sector is machine building, which includes military production, followed by chemicals and energy. Together, these three branches account for almost 75 percent of total heavy industrial output. Metallurgy and construction materials together constitute less than 25 percent of heavy industry. Forestry is a minor player in the game, contributing only about 3 percent to the value of heavy industry (Table 1). Wide fluctuations in production in the subgroups, however, can have a substantial impact on overall heavy industrial output. []

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Table 1
China: The Components of Heavy Industry, 1982

<u>Industrial Sector</u>	<u>Estimated Percent of Total</u>	<u>Estimated Contribution to Heavy Industrial Growth (Percent)</u>
Forestry	3	Negl.
Building Materials	7	1
Of which:		
Cement (3)		
Plate Glass (1)		
Metallurgy	16	1
Of which:		
Ferrous Metals (11)		
Nonferrous Metals (5)		
Energy	21	1
Of which:		
Electric Power (7)		
Coal and Coke (5)		
Petroleum (9)		
Chemicals	22	2
Machine Building	<u>31</u>	<u>4</u>
Total Heavy Industry	100	9+

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Machine Building--the Driving Force

The jump in heavy industry last year can be largely explained by a resurgence of activity in machine building. Machine building is by far the largest component of heavy industry, accounting for almost one-third of the total value of output. Early in 1982, the Chinese announced plans to boost machine building output by 5 percent for the year. By the end of September, however, production was running at a rate that was 15 percent higher than during the previous year. By that time, Chinese policymakers may have realized that a 1 percent target for heavy industry was too low to satisfy domestic demand and export requirements for machinery and equipment. [REDACTED]

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Machine building ended the year with an increase of 15.2 percent, accounting for about 4 percentage points of the overall jump of 9.9 percent in heavy industry. Nevertheless, the industry still operated below capacity, and not one important category in machine building reached peak output. (Table 2). [REDACTED]

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The Components of Machine Building

Transport Equipment

China's underdeveloped transport sector is one of the main drags on the economy, and the leadership has singled out the industry for rapid growth. Production of transport equipment last year reflected this policy. Output of freight wagons and locomotives jumped more than 20 percent, while production of motor vehicles and internal combustion engines rose between 10 and 15 percent. Output of passenger coaches changed little from the previous year, but construction of civilian ships rose almost 9 percent in value terms (only 1 percent in quantity terms). Moreover, early reporting for 1983 shows continuing increases across the board in production of transport equipment. [REDACTED]

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Energy Equipment

Priority given to the development of energy industries shows up in the production data for power generating and mining equipment (much of it used for coal mining). Production of mining equipment rose 37 percent, and power generators jumped by almost 18 percent. These two industries, however, still operated far below the peak year of 1979. [REDACTED]

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Agricultural Machinery

Production data for agricultural machinery last year show a sharp decline in large tractors and a surge in walking tractors. This reflects a shift in China's agricultural policy which is affecting the machine building industry. [REDACTED]

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[REDACTED] the Ministry is faced with massive retooling of agricultural machinery plants. This is necessary to reduce production of tractors for large-scale cultivation used under the commune system and to raise output of smaller machinery suitable for the small plot "agricultural responsibility" system. [REDACTED]

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[REDACTED] this policy shift has rendered much of the old

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Table 2

China: Production by the Machine Building Industry

<u>Category</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>% Change 1982/81</u>
<u>Transport Equipment</u>						
Locomotives (units)	521	573	512	398	486	22.1
Railroad Passenger Coaches (units)	784	856	1,002	1,159	1,153	-0.5
Freight Wagons (units)	17,000	16,000	10,571	8,779	10,560	20.3
Internal Combustion Engines (1,000 hp)	2,818	2,908	2,539	2,004	2,296	14.6
Steel Ships (1,000 tons)	861	809	818	832	838	1.0
Motor Vehicles (1,000 units)	149	186	222	176	196	11.4
<u>Energy Equipment</u>						
Power Generating (1,000 kw)	4,838	6,212	4,193	1,395	1,645	17.9
Mining Equipment (1,000 tons)	243	264	163	115	158	37.4
<u>Farm Equipment</u>						
Walking Tractors (1,000 units)	324	318	218	199	298	49.7
Heavy Tractors (1,000 units)	114	126	98	53	40	-24.5
<u>Metal Cutting</u>						
Machine Tools (1,000 units)	183	140	134	103	100	-2.9

machinery useless, causing a major setback in China's program to mechanize agriculture. Data for early 1983 show a continuing upward trend in production of small walking tractors for family use. [REDACTED]

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Machine Tools

China's machine tool industry last year continued the precipitous slide in output that started in 1979. The industry is operating at about 50 percent of capacity, producing a little more than 100,000 units per year. The drag on heavy industry, however, probably was not as great as the production figures suggest. In recent years, the Chinese have been upgrading the machine tool industry with foreign assistance under coproduction and licensing agreements. They have signed contracts with at least a dozen companies in Japan, Western Europe, and the United States. The decline in output, therefore, has been partly offset by an increase in quality. This trend means that the total value of machine tool production last year may actually have been greater than in 1981. A higher value thus could have contributed in a small way to the 9.9 percent jump in overall heavy industrial growth. [REDACTED]

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Military Machine Building--Unexpected Growth

Chinese press statements claim that defense industries increased total output last year by 10.9 percent. These reports do not state, however, that the primary reason for the increase in production was because of a dramatic jump in exports to Third World countries. The Iran-Iraq conflict opened new markets in the volatile Middle East, [REDACTED]

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China's defense industry was well positioned last year to gear up for export production. The industry was hit hard during the readjustment years of 1979-81 and was operating far below capacity. Many plants had converted to production of civilian items or were performing overhaul and modification work on existing weapons. Unexpected export orders clearly provided a shot in the arm to a number of defense plants, as well as adding to the surge in the index of heavy industrial production. [REDACTED]

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Chemicals Add Another Two Percent

Increased production of chemicals last year probably accounted for a 2 percent jump in the total value of heavy industrial production. The chemical industry provides an estimated 22 percent of heavy industrial output, second in importance only to machine building. Production data for nine major chemical products shows that eight increased and that seven reached all time highs (Table 3). The Chinese have pushed development of the chemical industry for years, and growth rates have traditionally been among the highest of all

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Table 3

China: Production of Selected Chemicals

	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>% Change 1982/81</u>
Sulphuric Acid (million tons)	6.61	7.00	7.64	7.81	8.17	4.5
Soda Ash (million tons)	1.33	1.49	1.61	1.65	1.73	4.8
Caustic Soda (million tons)	1.64	1.83	1.92	1.92	2.07	7.8
Ethylene (thousand tons)	380	434	490	505	560	10.9
Calcium Carbide (thousand tons)	124	141	152	151	167	10.6
Chemical Fertilizer (million tons)	8.69	10.65	12.32	12.39	12.78	3.1
Insecticides (thousand tons)	533	537	537	484	457	-5.9
Rubber Tires (million pieces)	9.36	11.69	11.46	7.29	8.64	18.5
Plastics (thousand tons)	679	793	898	916	1,003	9.5

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industrial sectors. Except for rubber tires, which fell sharply during the retrenchment in 1981 when vehicle output dropped, production of chemical products has grown steadily since the late 1970s. The chemical industry supplies basic inputs to agriculture and light industry, two sectors that the Chinese have singled out in recent years for priority development. []

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Metals--A Minor Contribution

China's metals industry last year added about 1 percentage point to the increase in heavy industry, the same amount as the building materials component. Metals production as a whole accounts for an estimated 16 percent of total heavy industrial output, and iron and steel showed modest growth.* Crude steel production increased by 4 percent, bringing output back up to the level achieved in 1980. Rolled steel jumped almost 9 percent and reached an all time high of 29 million tons (Table 4). []

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Table 4

China: Production of Ferrous Metals
(million tons)

<u>Year</u>	<u>Pig Iron</u>	<u>Percent Change</u>	<u>Crude Steel</u>	<u>Percent Change</u>	<u>Rolled Steel</u>	<u>Percent Change</u>
1978	34.8		31.8		22.1	
1979	36.7	5.4	34.5	8.5	25.0	13.1
1980	38.0	3.5	37.1	7.5	27.2	8.8
1981	34.2	-10.0	35.6	-4.0	26.7	-2.0
1982	35.5	3.8	37.1	4.2	29.0	8.6

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Chinese press reports claim that increasing amounts of rolled steel were consumed by light industry and in the construction of housing. Rural consumption of rolled steel also increased last year to a level of 5.5 million tons, more than 1 million tons higher than the amount supplied in 1980. Rolled steel used on the farm is mainly for repair of machinery and tools, building rural enterprises, and home construction. []

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Energy Industries Provide a Slight Boost

The net effect of changes in energy production last year probably increased heavy industry output by about 1 percent, the same as building materials and metals. Energy production accounts for approximately 20 percent of the total value of heavy industry, and output of coal increased 7 percent and electric power went up by 6 percent in 1982. Crude oil production remained at the same level as during the previous year. Natural gas was the

* The Chinese do not publish detailed information on their nonferrous metals industry because they consider it to be a strategic sector.

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only loser, dropping 6 percent below the level reached in 1981. Natural gas, however, is a minor component of the energy pie in China, and changes in production levels would have little impact on the total value of heavy industry (Table 5). []

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Table 5
China: Production of Energy

Year	Coal (Million tons)	Crude Oil (Million tons)	Electric Power (Billion kwh)	Natural Gas (100 million cu.m)
1978	618	104	256.6	137
1979	635	106	282.0	145
1980	620	106	300.6	142
1981	622	101	309.3	127
1982	666	102	327.7	119

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Building Materials--Marginal Impact on Heavy Industry

Production of construction materials increased sharply in 1982, with cement up almost 15 percent and plate glass almost 16 percent higher. Nevertheless, because construction materials represent such a small portion of heavy industrial output (only 7 percent), the impact of the increase probably added no more than 1 percent to the value of heavy industrial production. []

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Cement, glass, and other building materials have historically been in short supply, and the Chinese have given high priority to boosting output. Production has increased steadily in recent years, even during the retrenchment in heavy industry during 1980-81 (Table 6). Chinese officials maintain that the sharp rise in production of cement and plate glass last year was a favorable trend because these items were needed in increasing amounts to support construction of houses in urban and rural areas. In 1982, for example, the Chinese claim to have completed 84 million square meters of housing, setting a record for the amount of urban dwellings constructed in a single year. []

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Table 6

China: Production of Selected Construction Materials

Year	Cement (million tons)	Percent Change	Plate Glass (1,000 Standard Cases)	Percent Change
1978	65.2		200	
1979	73.9	13.3	233	16.5
1980	79.9	8.1	277	18.9
1981	82.9	3.8	306	10.5
1982	95.2	14.8	355	16.0

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Heavy Industrial Production Difficult to Control

Although the magnitude of the increase in heavy industry in 1982 was surprising, the general pattern of growth was in line with China's broad economic objectives. Beijing has singled out specific bottleneck sectors for development, and plant managers responded by producing capital goods and other products for transport, energy, agriculture, housing construction, and export industries (Table 7). The 1 percent growth target set earlier in 1982 may have been revised upward as the year progressed, when it became apparent to policymakers that strong demand for machinery and equipment would boost output above original targets. The machine building industry was able to respond rapidly because the retrenchment in 1981 left many plants operating far below capacity. []

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Part of the increased demand for heavy industrial items resulted from China's long-range program to upgrade existing enterprises. This effort is a cornerstone of Beijing's industrial modernization plan during the 1980s. The upgrade effort calls for replacing old equipment with new machinery that is more efficient in using raw materials and energy. []

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Another reason that output of heavy industry is difficult to control is that China's reform policies have made "profit-maximizers" out of plant managers. Higher sales, in other words, create larger profits for individual plants. Relying more heavily on market forces, which is an important aspect of industrial reform, makes it much more difficult for central planners to call the shots and accurately monitor the level of production. []

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Table 7
China: Index of Heavy Industrial Production, 1970 Prices
(1980=100)

	<u>1980</u>	<u>1981</u>	<u>1982</u>
Total Heavy Industry	100	95	103
Metallurgy	100	97	102
Energy	100	99	103
Chemicals	100	104	112
Building Materials	100	100	114
Forestry	100	99	87
Machine Building	100	83	97

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Striking a proper balance between heavy and light industry is continuing to frustrate Chinese planners. Data for the first quarter of this year, for example, show heavy industry up by almost 12 percent over 1982, and officials from the State Economic Commission have already complained that this excessive growth is causing difficulties for light industry. If Beijing is unable to sharply reduce the tempo of heavy industrial growth, we can expect additional pressures on energy supplies and further difficulties for producers of consumer goods. []

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China's inability to tightly control industrial production serves to underscore that Beijing is far from being able to "fine tune" its economy,

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even in those sectors where planning and control mechanisms should be well developed. As a result, we anticipate that total heavy industrial production for the year will end up in the 5 to 7 percent range, considerably higher than the target of 3 percent. This is because plant managers have additional excess capacity in the machine building sector that gives them continued opportunities to exceed state plans.

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